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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/757,791	01/15/2004	Manoj Singhal	15155US01	5464

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EXAMINER

NEWAY, SAMUEL G

ART UNIT	PAPER NUMBER
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2626

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/757,791	Applicant(s) SINGHAL, MANOJ	
	Examiner Samuel G. Neway	Art Unit 2626	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 26 December 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-7, 10-17 and 20 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-7, 10-17 and 20 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
 - ☐ Certified copies of the priority documents have been received in Application No. _____.
 - ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

1. This is responsive to the Amendment filed on 26 December 2007.
2. In the Amendment, it is erroneously noted that claims 1, 3 – 6, 8 – 11, and 18 – 20 are pending. In fact, claims 1 – 7, 10 – 17, and 20 are pending and are considered below.

Response to Amendment

3. The objection to the Drawings is withdrawn in view of Applicant's amendments.

Response to Arguments

4. Applicant's arguments filed 26 December 2007 have been fully considered but they are not persuasive.

Applicant argues that there is no teaching in Abe of inverse filtering an audio signal with LPC coefficients resulting in a residual signal. However, Abe discloses extracting residual energy which, in LPC as is well known in the speech coding art, is done by inverse filtering an audio signal with LPC coefficients. In other words, inverse filtering an audio signal with LPC coefficients is inherent in residual signal extraction. This fact is explicitly and clearly disclosed in Koishida et al (USPN 6,658,383) which states that the “LPC coefficients and the music signals ... are then applied to an inverse filter 330 that ... generates as output a residual signal”.

Applicant also argues that Abe does not teach “decimating the frame, thereby causing the frame to comprise a predetermined number of samples”. The Examiner

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respectfully disagrees. Abe discloses in Figure 2 blocks (frames) which can be sampled at a certain frequency (decimated) causing the blocks to comprise a predetermined number of samples related to the frequency ("a total of five hundreds and twelve (512) samples obtained ... by using a sampling frequency of 16 kHz", col. 6, lines 57-64).

Claim Rejections - 35 USC § 102

5. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

6. Claims 1, 3 – 5, 11, and 13 – 15 are rejected under 35 U.S.C. 102(e) as being anticipated by Abe et al (USPN 6,990,443).

Claim 1:

Abe discloses a method for classifying an audio signal (Abstract), said method comprising:

calculating a plurality of linear prediction coefficients (LPC) for a portion of the audio signal (FIG. 3, item 13 and related text);

inverse filtering the portion of the audio signal with the plurality of linear prediction coefficients (LPC), thereby resulting in a residual signal (FIG. 3, item 20 and related text);

measuring the residual energy of the residual signal (FIG. 3, items 20, 36, and related text); and

comparing the residual energy to a threshold ("extracting the characteristic quantity of a signal ... and classifying the signal ... according to the characteristic quantity thereof", col. 3, lines 43-51).

Claim 3:

Abe discloses the method of claim 1, wherein the portion of the audio signal comprises a frame (FIG. 2 and related text).

Claim 4:

Abe discloses the method of claim 3, further comprising: decimating the frame, thereby causing the frame to comprise a predetermined number of samples (FIG. 2 and related text).

Claim 5:

Abe discloses the method of claim 1, further comprising: spectrally flattening the portion of the audio signal (FIG. 3, item 15 and related text).

Claims 11, and 13 – 15:

Claims 11, and 13 – 15 are similar in scope and content to claims 1, and 3 – 5; they are rejected with the same rationale.

Claim Rejections - 35 USC § 103

7. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

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(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

8. Claims 2 and 12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe et al (USPN 6,990,443) in view of Koishida et al (USPN 6,658,383).

Claim 2:

Abe discloses the method of claim 1, but he does not explicitly disclose classifying the portion of the audio signal as music, if the residual energy exceeds the threshold; and classifying the portion of the audio signal as speech, if the threshold exceeds the residual energy.

In a similar audio classification method, Koishida teaches that “linear prediction-based techniques such as CELP can deliver high quality reproduction for speech signals, but yield unacceptable quality for the reproduction of music signals” (col. 1, lines 33-37).

It would have been obvious to one with ordinary skill in the art at the time of the invention to use Abe’s residual energy to classify speech and music because as Koishida teaches LPC (linear predictive coding) techniques model speech better than they do music, therefore giving a smaller error (residual energy) for speech signals compared to the error for music signals.

Claim 12:

Claim 12 is similar in scope and content to claim 2 and is rejected with the same rationale.

9. Claims 6, 10, 16, and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Abe et al (USPN 6,990,443) in view of Rabiner, L ("Digital Processing of Speech Signals", Prentice-Hall, 1978).

Claim 6:

Abe discloses a method for classifying an audio signal (Abstract), said method comprising:

taking a discrete Fourier transformation of a portion of the audio signal for a plurality of frequencies (FIG. 3, item 12 and related text);

calculating a plurality of linear prediction coefficients (LPC) for the portion of the signal (FIG. 3, item 13 and related text);

In a textbook on speech processing, Rabiner discloses measuring an inverse filter response for said plurality of frequencies with said plurality of linear prediction coefficients (LPC) (page 433, equation 8.102 and related text); and

measuring a mean squared error between the discrete Fourier transformation of the portion of the audio signal for the plurality of frequencies and the inverse filter response (page 433, equation 8.103b and related text);

It would have been obvious to one of ordinary skill in the art at the time of the invention to perform Abe's method in the frequency domain in order to "see peaks at the formant frequencies" (Rabiner, page 433, lines 3-5).

Abe further discloses comparing the means squared error to a threshold ("extracting the characteristic quantity of a signal ... and classifying the signal ... according to the characteristic quantity thereof", col. 3, lines 43-51); and

wherein the portion of the audio signal comprises a frame (block), decimating the frame (sampling with 16 kHz), thereby causing the frame to comprise a predetermined number of samples (512 samples) (FIG. 2 and related text, see also “a total of five hundreds and twelve (512) samples obtained ... by using a sampling frequency of 16 kHz”, col. 6, lines 57-64).

Claim 10:

Abe and Rabiner disclose the method of claim 6, Abe further discloses: Spectrally flattening the portion of the audio signal (FIG. 3, item 15 and related text).

Claims 16 and 20:

Claims 16 and 20 are similar in scope and content to claims 6 and 10; they are rejected with the same rationale.

10. Claims 7 and 17 rejected under 35 U.S.C. 103(a) as being unpatentable over Abe et al (USPN 6,990,443) in view of Rabiner, L (“Digital Processing of Speech Signals”, Prentice-Hall, 1978, pages 433-435) and in further view of Koishida (USPN 6,658,383).

Claim 7:

Abe and Rabiner disclose the method of claim 8, but they do not explicitly disclose: classifying the portion of the audio signal as music, if the mean squared error exceeds the threshold; and classifying the portion of the audio signal as speech, if the threshold exceeds the means squared error energy.

In a similar audio classification method, Koishida teaches that “linear prediction-based techniques such as CELP can deliver high quality reproduction for speech

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signals, but yield unacceptable quality for the reproduction of music signals” (col. 1, lines 33-37).

It would have been obvious to one with ordinary skill in the art at the time of the invention to use Abe and Rabiner’s error to classify speech and music because as Koishida teaches LPC (linear predictive coding) techniques model speech better than they do music, therefore giving smaller error for speech signals compared to the error for music signals.

Claim 17:

Claim 17 is similar in scope and content to claim 7 and is rejected with the same rationale.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Samuel G. Neway whose telephone number is 571-270-1058. The examiner can normally be reached on Monday - Friday 8:30AM - 5:30PM EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David R Hudspeth can be reached on 571-272-7843. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/S. G. N./
Examiner, Art Unit 2626

/David R Hudspeth/
Supervisory Patent Examiner, Art Unit 2626